Patent claims

1. Method for heating a roller (10) used in the production and/or finishing of a web of material, particularly a paper web or paperboard web,
characterized in that
the heat required for heating the roller (10) is generated at least in part inside the roller (10) by combusting a fuel with air or oxygen at least in some regions inside the roller (10).

2. Method according to claim 1,
characterized in that
the roller (10) is operated in the manner of a catalytic burner.

3. Method according to claim 1 or 2,
characterized in that
the heat is generated at least in part on inner heat transfer surfaces (12) of the roller (10) which are coated with a catalyst.

4. Method according to one of the preceding claims,
characterized in that
the heat is generated at least in part in at least one space inside the roller (10) which is filled with a catalytic carrier or equipped with a catalytic surface.

5. Method according to one of the preceding claims,
characterized in that
a fuel gas is used as fuel.

6. Method according to claim 5,
characterized in that
the catalyst is supplied with a mixture of fuel gas and air in a mixture ratio that is adjustable or adjusted for an exothermic reaction.

7. Method according to claim 6,
characterized in that
the mixture of fuel gas and air is fed to peripheral bores (36) in the roller (10) and an exothermic reaction is made to take place in these peripheral bores (36).

8. Method according to claim 7,
characterized in that
the heat gas is fed from the peripheral bores (36) via radial ducts (38) to an annular region (42) filled with ducts (40) near the roller surface.

9. Method according to one of the preceding claims,
characterized in that
the mixture of fuel gas and air is fed to the roller (10) via at least one rotary inlet.

10. Method according to one of the claims 1 to 6,
characterized in that
the exothermic reaction takes place in a duct-filled annular region

(44) near the roller surface to which fuel gas is fed preferably via peripheral bores (46) in the roller (10) and radial ducts (48) extending therefrom and air is fed preferably via a central roller bore (50) and radial ducts (52) extending therefrom.

11. Method according to claim 10,
characterized in that
the fuel gas or the air is fed to the roller (10) via at least one rotary inlet.

12. Method according to one of the preceding claims,
characterized in that
the roller (10) is heatable on a zone basis viewed in the direction of the roller axis, with the various zones being heatable independently of each other at least in part.

13. Method according to one of the preceding claims,
characterized in that
on a roller (10) with a casing (56) rotating around a non-rotatable core (54) an exothermic reaction is made to take place in the region of the surface of the roller core (54) or in a duct-filled annular region of the rotatable roller casing (56).

14. Method according to claim 13,
characterized in that
an exothermic reaction is made to take place in the region of duct structures provided on the surface of the roller core (54).

15. Method according to claim 13 or 14,
characterized in that

the surface of the roller core (54) or the duct structures provided thereon are coated with a catalyst at least in part.

16. Method according to one of the claims 13 to 15,
characterized in that
by means of seals (58) and several feed ducts or bores (60) opening into the duct structures for fuel gas and air or a mixture of fuel gas and air, the roller (10) is divided into axial zones that are heatable independently of each other at least in part.

17. Method according to one of the preceding claims,
characterized in that
the reaction or roller temperature is adjusted by means of the fuel/air mass flow ratio (stoichiometry).

18. Method according to one of the preceding claims,
characterized in that
an overstoichiometric combustion or combustion with a surplus of oxygen is made to take place.

19. Method according to one of the preceding claims,
characterized in that
hydrogen is used as fuel.

20. Method according to one of the preceding claims,
characterized in that
reformat or an H_2-rich gas obtained from natural gas is used as fuel.

21. Method according to one of the preceding claims,
characterized in that

at least one noble metal such as in particular platinum, palladium, rhodium and/or the like is used as catalyst.

22. Method according to one of the preceding claims,
characterized in that
the fuel gas mass flow is controlled preferably by means of a volumetric flow measurement (30) and a corresponding control valve (28).

23. Method according to one of the preceding claims,
characterized in that
the fuel gas concentration in the air is controlled preferably by means of a fuel gas sensor (32) and a corresponding control valve (28).

24. Method according to one of the preceding claims,
characterized in that
the roller temperature is controlled preferably by means of a roller temperature measurement and a corresponding control valve.

25. Method according to one of the claims 22 to 24,
characterized in that
the respective control is performed on a zone basis at least in part.

26. Heatable roller (10) used in the production and/or finishing of a web of material, particularly a paper web or paperboard web,
characterized in that
the heat required for heating is generated at least in part by combusting a fuel with air or oxygen inside the roller (10).

27. Roller according to claim 26,
c h a r a c t e r i z e d in that
it is configured simultaneously in the manner of a catalytic burner.

28. Roller according to claim 26 or 27,
c h a r a c t e r i z e d in that
it has inner heat transfer surfaces (12) coated with a catalyst.

29. Roller according to one of the preceding claims,
c h a r a c t e r i z e d in that
it has at least one space inside, which is filled with a catalytic carrier or equipped with a catalytic surface.

30. Roller according to one of the preceding claims,
c h a r a c t e r i z e d in that
a fuel gas is provided as fuel.

31. Roller according to claim 30,
c h a r a c t e r i z e d in that
it is supplied with a mixture of fuel gas and air in a mixture ratio that is adjustable or adjusted for an exothermic reaction.

32. Roller according to claim 31,
c h a r a c t e r i z e d in that
the mixture of fuel gas and air is fed to peripheral bores (36) in the roller (10) and the exothermic reaction takes place in these bores (36).

33. Roller according to claim 32,
c h a r a c t e r i z e d in that

the heat gas is fed from the peripheral bores (36) via radial ducts (38) to an annular region (42) filled with ducts (40) near the roller surface.

34. Roller according to one of the preceding claims, characterized in that the mixture of fuel gas and air is fed to the roller (10) via at least one rotary inlet.

35. Roller according to one of the claims 26 to 31, characterized in that the exothermic reaction takes place in a duct-filled annular region (44) near the roller surface to which fuel gas is fed preferably via peripheral bores (46) in the roller (10) and radial ducts (48) extending therefrom and air is fed preferably via a central roller bore (50) and radial ducts (52) extending therefrom.

36. Roller according to claim 35, characterized in that the fuel gas or the air can be fed to the roller (10) via at least one rotary inlet.

37. Roller according to one of the preceding claims, characterized in that the roller (10) is heatable on a zone basis viewed in the direction of the roller axis, with the various zones being heatable independently of each other at least in part.

38. Roller according to one of the preceding claims, characterized in that

it comprises a non-rotatable core (54) and a casing (56) rotating around said core, and the exothermic reaction takes place in the region of the surface of the roller core (54) or in a duct-filled annular region of the rotatable roller casing (56).

39. Roller according to claim 38,
characterized in that
the exothermic reaction takes place in the region of duct structures provided on the surface of the roller core (54).

40. Roller according to claim 38 or 39,
characterized in that
the surface of the roller core (54) or the duct structures provided thereon are coated with a catalyst at least in part.

41. Roller according to one of the claims 38 to 40,
characterized in that
by means of seals (58) and several feed ducts or bores (60) opening into the duct structures for fuel gas and air or a mixture of fuel gas and air it is divided into axial zones that are heatable independently of each other at least in part.

42. Roller according to one of the preceding claims,
characterized in that
the reaction or roller temperature is adjustable by means of the fuel/air mass flow ratio (stoichiometry).

43. Roller according to one of the preceding claims,
characterized in that

an overstoichiometric combustion or combustion with a surplus of oxygen takes place.

44. Roller according to one of the preceding claims, characterized in that hydrogen is provided as fuel.

45. Roller according to one of the preceding claims, characterized in that reformat or an H_2-rich gas obtained from natural gas is provided as fuel.

46. Roller according to one of the preceding claims, characterized in that at least one noble metal such as in particular platinum, palladium, rhodium and/or the like is provided as catalyst.

47. Roller according to one of the preceding claims, characterized in that the fuel gas mass flow is controllable, for which purpose preferably a volumetric flow measurement device (30) and a corresponding control valve (28) are provided.

48. Roller according to one of the preceding claims, characterized in that the fuel gas concentration in the air is controllable, for which purpose preferably a fuel gas sensor (32) and a corresponding control valve (28) are provided.

49. Roller according to one of the preceding claims,
characterized in that
the roller temperature is controllable, for which purpose preferably a device for measuring the roller temperature and a corresponding control valve are provided.

50. Roller according to one of the claims 47 to 49,
characterized in that
the respective control is performed on a zone basis at least in part.

51. Roller according to one of the preceding claims,
characterized in that
the duct structures provided on the surface of the roller core (54) are produced by etching at least in part.

52. Roller according to one of the preceding claims,
characterized in that
the duct structures provided on the surface of the roller core (54) are produced by milling at least in part.

53. Roller according to one of the preceding claims,
characterized in that
the coating with the catalyst is produced by rinse coating, dip coating or spray coating.

54. Roller according to one of the preceding claims,
characterized in that
the roller casing (56) is shrink-fitted onto the roller core (54) and/or is soldered to it.